Substation Reliability

Contract #: 500-97-012 **Project #:** 15
Contractor: Edison Technology Solutions/Southern California Edison
Project Amount: $215,000
Contractor Project Manager: Moham Kondragunta (626) 815-0507
Commission Contract Manager: Linda Davis (916) 654-3848
Status: Completed

Project Description:
The purpose of this project was to develop an intelligent alarm analysis and diagnostics system, the Alarm Analyzer. The system simplifies thousands of pieces of information and alarms during an emergency condition, such as a regional system breakup due to a fault. In a matter of seconds, the operator is presented with only the relevant and highest priority information on system status and a recommended course of action. This compares to hours or days to do the same manually.

Voice data and command entry is established in control room consoles. During system disturbances, switching and other load and grid operations must be executed quickly and accurately. Speech recognition tools being adapted and evaluated through this project will free the operator from the keyboard to permit data entry and commands by voice. This project improves substation system efficiency, reliability and capacity and reduces operation and maintenance costs. This project helps electrical system operators to provide a much quicker response time during transmission system breakup and disturbance.

The Alarm Analyzer improves the accuracy of control room operator decisions by assisting in quickly identifying the type of fault and accurately identifying its location. This information is essential in reducing the amount of outage time and costs to the users and the utilities. Crews can be dispatched with the correct materials for repairs to the precise trouble location and system reconfiguration can be implemented immediately to restore service through alternate routes.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California's electricity by reducing restoration and fault analysis time from hours or days to minutes.
- Improving the energy cost/value of California's electricity by reducing operations and maintenance costs.
- Improving the environmental and public health costs/risks of California's electricity by reducing the risk of operation mistakes during power disturbances.

Proposed Outcomes:

1. Complete the initial stage of development of an intelligent alarm analysis and diagnostics system to automatically classify and filter the thousands of pieces of information and alarms generated during an abnormal event on the grid, such as a regional blackout caused by a fault.
2. Investigate the feasibility of the Alarm Analyzer tool.
3. Implement voice recognition technology and evaluate its benefits in the entry of data and commands into a computer or other device in control rooms and other applications.

Actual Outcomes:

1. Southern California Edison (SCE) completed its objectives by developing the Alarm Analyzer tool, implementing voice recognition technology, and conducting successful demonstrations of each.
2. Use of the Alarm Analyzer tool reduced the time required to produce an accurate diagnostic of an event from several hours or days to less than two minutes. These results are based on simulations of actual events occurring at the Dalton Substation.
3. The voice recognition tools evaluated in this project resulted in a productivity increase of at least 200 percent in entering information into a computer file, with an accuracy rate greater than 97 percent. These results are based on a comparison between keyboard entry methods and voice input.
4. Operations and maintenance costs are reduced by improving productivity through data entry and control of computers via voice. Dictating directly to the computer was found to improve productivity by at least 200 percent and greatly simplified multi-tasking for control room operators, line patrols, and office personnel.

Project Status:

The project has been completed. For the final report, please right click on www.energy.ca.gov/pier/final_project_reports/600-00-022.html